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## EXAMINATION PRIZES FOR 1865.

### THE PRINCE CONSORT'S PRIZE.

130. His Royal Highness the late President of the Society was pleased to offer annually to the candidate who, obtaining a certificate of the first-class in the current year, shall have obtained in that year and the three years immediately preceding it, the greatest number of such certificates, a Prize of TWENTY-FIVE GUINEAS, and this Prize Her Majesty the Queen has graciously intimated her intention to continue. This Prize cannot be taken more than once by the same candidate. It will be accompanied by a certificate from the Society of Arts, setting forth the special character of the Prize, and the various certificates for which it was granted.

### GENERAL PRIZES.

\*.\* No Prize in any subject will be awarded to a Candidate who does not obtain a Certificate of the first-class therein.

1. Arithmetic .....	{ First Prize, £5. Second Prize, £3.	18. Animal Physiology (in relation to Health) .....	{ First Prize, £5. Second Prize, £3. Additional by Gift of Harry Chester, Esq. :— Third Prize, £2; and Three Prizes of Books, value £1 each.
2. Book-keeping .....	{ First Prize, £5. Second Prize, £3.	19. Domestic Economy...	{ First Prize, £5. Second Prize, £3.
3. Algebra .....	{ First Prize, £5. Second Prize, £3.	20. Political and Social Economy.....	{ First Prize, £5. Second Prize, £3.
4. Geometry .....	{ First Prize, £5. Second Prize, £3.	21. Geography .....	{ First Prize, £5. Second Prize, £3.
5. Mensuration.....	{ First Prize, £5. Second Prize, £3.	22. English History .....	{ First Prize, £5. Second Prize, £3. Additional by Gift of Sir C. Wentworth Dilke, Bart. :— Third Prize, £2; and Three Prizes of Books, value £1 each.
6. Trigonometry .....	{ First Prize, £5. Second Prize, £3.	23. English Literature ...	{ First Prize, £5. Second Prize, £3. Additional by Gift of Sir C. Wentworth Dilke, Bart. :— Third Prize, £2; and Three Prizes of Books, value £1 each.
7. Conic Sections.....	{ First Prize, £5. Second Prize, £3.	24. Logic and Mental Science ... ..	{ First Prize, £5. Second Prize, £3.
8. Navigation and Nauti- cal Astronomy...	{ First Prize, £5. Second Prize, £3.	25. Latin and Roman History .....	{ First Prize, £5. Second Prize, £3.
9. Astronomy .....	{ First Prize, £5. Second Prize, £3.	26. French .....	{ First Prize, £5. Second Prize, £3.
10. Principles of Me- chanics.....	{ First Prize, £5. Second Prize, £3.	27. German .....	{ First Prize, £5. Second Prize, £3.
11. Practical Mechanics	{ First Prize, £5. Second Prize, £3.	28. Italian .....	{ First Prize, £5. Second Prize, £3.
12. Electricity and Mag- netism .....	{ First Prize, £5. Second Prize, £3.	29. Spanish .....	{ First Prize, £5. Second Prize, £3.
13. Light and Heat .....	{ First Prize, £5. Second Prize, £3.	30. Freehand Drawing ...	{ First Prize, £5. Second Prize, £3.
14. Chemistry .....	{ First Prize, £5. Second Prize, £3.	31. Geometrical Drawing	{ First Prize, £5. Second Prize, £3.
15. Mining and Metal- lurgy .....	{ First Prize, £5. Second Prize, £3. Additional by Gift of Sir Thomas Phillips, F.G.S. :— Third Prize, £2; and Three Prizes of Books, value £1 each.	32. Theory of Music.....	{ First Prize, £5. Second Prize, £3.
16. Botany .....	{ First Prize, £5. Second Prize, £3.		
17. Agriculture .....	{ First Prize, £5. Second Prize, £3. Additional by Gift of J. C. Morton, Esq. :— Third Prize, £2; and Three Prizes of Books, value £1 each		

## LOCAL EDUCATIONAL BOARDS.

The following is a List of the places at which Local Boards have already been formed, with the names of the Secretaries, from whom intending Candidates and others may obtain information relative to the Examinations:—

LOCAL BOARDS.	SECRETARIES.		
Aberdeen .....	Mr. James Sinclair, Mechanics' Institution, Aberdeen.	Edinburgh .....	Mr. H. Bowie, Philosophical Institution.
Accrington .....	Mr. H. G. Duffield, Accrington.	Faversham .....	Mr. Frederick W. Monk, Managing Director of the Faversham Institute.
Airdrie .....	Mr. B. M. McCrae, Airdrie.	Gilford (Ireland) Young Men's Mutual Improvement Society .....	Dr. Henry McBride, M.D., Gilford, Co. Down, Ireland.
Aldershot and Farnham District .....	Mr. Barrow Rule, M.C.P., Principal of the Classical and Mathematical School, Aldershot.	Glasgow Athenæum .....	Mr. Moses Provan, Accountant, 110, West George-street, Glasgow.
Ashford .....	Mr. F. Garaway, Schoolmaster, Ashford New Town.	Glasgow Institution .....	Mr. John Craig, F.E.I.S., Glasgow Institution, 37, Cathedral-street, Glasgow.
Ashton and Dukinfield ...	Mr. James Gould, Mechanics' Inst., Ashton-under-Lyne.	Glasgow Mechanics' Institution .....	Mr. Robert McIntyre, Director, &c., 96, North Hanover-street, Glasgow.
Bacup .....	Mr. Thos. Newbigging, Bacup.	Glasgow Popular Evening Classes, Andersonian University .....	Mr. Geo. Martin, 11, Gt. Western-road, Glasgow.
Banbridge (Ireland) Literary and Mutual Improvement Society .....	Mr. Alexander Black, Banbridge, County Down, Ireland.	Gosport and Alverstoke Literary and Scientific Institution .....	Mr. William Short, 56, High street, Gosport.
Banbury .....	Mr. John H. Beale, Banbury.	Greenwich .....	Mr. Jas. Spencer, 3, Wintown-place, Greenwich, S.E.
Barnet .....	Mr. John Thimbleby, Barnet.	Halifax Mechanics' Institution .....	Mr. A. C. Foster, Solicitor, 1, Westgate, Halifax.
Belfast .....	Rev. Wm. C. McCullagh, Ballysillan, Belfast.	Halifax Working Men's College .....	Mr. Geo. Gibb, Haley Hill, Halifax.
Birmingham and Midland Institute .....	Mr. Thos. Martineau, Solicitor, Cannon-st., Birmingham.	Hartlepool (West) .....	Mr. Thos. Preston Brunton, and Mr. John Thomas Belk, Solicitors, West Hartlepool.
Bishop's Stortford .....	Mr. F. F. Woodham Nash, B.A., Sion House, Birchanger, Bishop's Stortford.	Hertford .....	Mr. J. L. Foster, Hertford.
Blackburn .....	Mr. W. Gourlay & Mr. J. H. Margerison, Blackburn.	Hitchin .....	Mr. Joseph Pollard, Hitchin, near Hitchin.
Blandford .....	Mr. J. B. Green, Architect, &c., Salisbury-street, Blandford.	Holmfirth .....	Mr. J. Batley, Holmfirth.
Bolton .....	Mr. W. H. J. Traice, Moses-gate, Bolton.	Hull .....	Mr. P. Blackmore, Young People's Institute, Hull.
Bradford .....	Mr. R. Whitaker, Mechanics' Institution, Bradford.	Hyde .....	Mr. William Gee, Mechanics' Institute, Hyde.
Brighton (for Sussex) .....	Mr. Barclay Phillips, 75, Lansdowne-place, Brighton.	Ingrow-cum-Hainworth ..	Mr. Jackson, Ingrow-cum-Hainworth.
Bristol .....	Mr. F. W. Cross, Athenæum, Bristol.	Ipswich .....	Mr. Edwin Barrett, 31, Cornhill, & Mr. Herbert Wright, 44, Handford-road, Ipswich.
Brompton (near Chatham) .....	Mr. J. Greenleaf, 8, Prospect-row, Brompton, Chatham.	East Lancashire Union of Mechanics' Institutions, Burnley .....	Mr. John Sutherland, Post-office, Burnley .....
Bucks and Berks Adult Education Society, Windsor .....	Rev. Thomas Rooke, M.A., St. Alban-street, Windsor.	„ Haslingden ..	Mr. J. Binns, Haslingden.
Bury (Lancashire) .....	Mr. Edmund Bunting, Athenæum, Bury.	„ Rawtenstall ..	Mr. T. Thomas, Rawtenstall.
Bury St. Edmund's .....	Mr. John Jackson, Head Master of the Commercial School, Bury St. Edmund's.	Leeds West Riding Union ..	Mr. Barnett Blake, Agent of the Yorkshire Union of Mechanics' Institutions.
Canterbury .....	Mr. W. D. Furley, Canterbury.	Leeds Young Men's Christian Association .....	Messrs. M. Cranswick and H. Clapham, 9, East-parade, Leeds.
Carlisle Mechanics' Institute .....	Miss Jane Williamson, Mechanics' Institute, Carlisle.	Leicester .....	Rev. H. D. Vaughan, St. Martin's Vicarage, Leicester.
Chatham, Rochester, Strood, and Brompton ..	Mr. F. Butler, 112, High-street, Chatham.	Lichfield .....	Rev. R. M. Grier, B.A., Lichfield.
Chelmsford .....	Mr. W. Cutts and Mr. Jesse Garrod, Chelmsford.	Liverpool .....	Rev. A. Hume, D.C.L., LL.D., 24, Clarence-st., Everton.
Crewe .....	Mr. George Lord, High Town, Crewe.	Lockwood .....	Mr. Alfred Lee, Mechanics' Institution, Lockwood.
Croydon .....	Mr. Francis Warren, Bookseller, 131, High-street.	London, City of London College, Sussex Hall, London, E.C. ....	Mr. W. H. Hansen, City of London College, Sussex Hall, Leadenhall-street, E.C.
Darlington .....	Mr. F. T. Steavenson, Darlington.	„ Royal Polytechnic Institution (Limited) ..	Mr. James Cousens, Royal Polytechnic Institution.
Deptford .....	Mr. T. Earland, 2, Wellington-grove, Greenwich-road.	London Metropolitan Association:—	
Derby .....	Mr. H. M. Holmes, Hon. Local Sec. to the Society of Arts, London-road, Derby.	„ Bayswater ..	Mr. C. Baker, 15, St. Peters-burg-place, Bayswater, W.
Devonport .....	Mr. Wm. Mogg and Mr. Samuel Chapple, Mechanics' Institute, Devonport.	„ Clapham .....	Mr. E. Heller, Clapham.
		„ Hackney .....	Mr. H. Gray, Working Men's Inst., Triangle, Hackney.

Lond. Met. Assoc. :—		Sheffield .....	Mr. T. Rowbotham, People's College, Sheffield.
„ Lambeth .....	Mr. T. Heller, Hercules' buildings, Lambeth, S.	Skipton .....	Mr. George Kendall, Skipton.
„ Mechanics' Institution .....	Mr. T. A. Reed, 41, Chancery-lane, W.C.	Slough.....	Mr. James Chapman, Upton-grove, Slough.
„ Notting-hill ...	Mr. T. Timson, James-street, Notting-hill, W.	Southampton .....	Mr. W. Johnson, Athenæum, Southampton.
„ Paddington ...	Mr. B. Shaw, Cambridge-square, W.	Southern Counties' Adult Education Society .....	Hon. and Rev. S. Best, Andover.
„ Pimlico .....	Mr. C. Thompson, Pimlico Literary Institution, Winchester-street, Pimlico, S.W.	South Staffordshire Union of Educational Inst. ...	Mr. J. Jones, The Trindle, Dudley.
„ St. James's, Westminster .....	Mr. Joseph Randall, 45, Marshall-street, Golden-sq., W.	„ Bilston .....	Rev. H. F. Newbolt.
„ St. Stephen's, Westminster .....	Mr. J. Cawood, St. Stephen's School, Westminster.	„ Cradley .....	Rev. J. H. Thompson.
„ St. Thomas, Charterhouse, Evening Classes .....	Mr. G. Phillipson, St. Thomas' Charterhouse School.	„ Dudley .....	Mr. J. Stokes, Solicitor, Dudley.
„ Spitalfields and Bethnal-green .....	Mr. T. N. Day, Abbey-street School, Bethnal-green, N.E.	„ Handsworth ...	Mr. G. D. Boyle.
„ Stepney Deanery .....	Mr. W. F. Ives, St. John's School, Limehouse.	„ Kinver .....	Mr. T. Bolton.
Louth .....	Mr. Benjamin Crow, Mechanics' Institution, Louth.	„ Smethwick ...	Mr. F. Talbot, Messrs. Chance's Library, Smethwick.
Lynn (King's) .....	Mr. T. Burton, 16, Buckingham-terrace, Lynn.	„ Stourbridge ...	Rev. J. W. Grier, Amblecote.
Macclesfield .....	Mr. J. O. Nicholson, Macclesfield.	„ Walsall .....	Rev. A. C. Irvine.
Manchester .....	Mr. A. Jarrett, Manchester Mechanics' Institution.	„ Wednesbury...	Mr. C. Britten.
Middlesbro' .....	Mr. William Taylor, Mechanics' Institute, Middlesbro'.	„ West Brom-wich .....	Rev. J. Whewell.
Mossley .....	Mr. Aaron Tetlow, Mossley.	„ Willenhall ...	Mr. J. Bennett.
Newbury.....	Mr. T. Gurney, Newbury.	„ Wolverhampton .....	Mr. J. N. Langley, Mowbray House, Wolverhampton.
Newcastle - on - Tyne Church of England Institute .....	Mr. Joseph Forster, St. John's School, Newcastle-on-Tyne.	„ Wordsley .....	Rev. J. Boulbee.
Newcastle-on-Tyne, Mechanics' Institution.	Mr. Adam Carse, 18, Mosley-street, Newcastle.	Wakefield .....	Mr. W. S. Banks, Solicitor, Wakefield.
Nottingham .....	Dr. W. Tyndal Robertson, Nottingham.	Warminster .....	Mr. F. Morgan, Warminster.
Oldham .....	Rev. John Hodgson, Queen-street, Oldham.	Waterford .....	Mr. James Budd, Thomas-street, Waterford.
Oldham Science School...	Rev. D. M. Alexander, Oldham.	Wellingborough.....	Mr. Thos. S. Curtis, Wellingborough.
Paisley .....	Mr. Charles Dalton Wason, Teacher, St. George's School, Paisley.	Wigan .....	Mr. James Seward, Dicconson-street, Wigan.
Pembroke Dock .....	Mr. T. H. Eastlake, H.M. Dockyard, Pembroke Dock.	Worcestershire Union of Educational Institutes.	Rev. Maurice Day, College Green, Worcester.
Peterborough .....	Mr. C. T. Cotton, Long-causeway, Peterborough.	York .....	Mr. Chas. Cumberland, Inst. of Popular Science, York.
Poole .....	Mr. Robert Belben, Accountant, Longfleet, Poole.	Yorkshire Union :—	
Portsmouth.....	Mr. Andrew Murray, H.M. Dockyard, Portsmouth.	„ Acomb, near York .....	Mr. T. Copley, Acomb.
Richmond .....	Rev. W. Bashall, A.M., 3, Cambridge - villas, Richmond-hill, S.W.	„ Eccleshill .....	Mr. B. Baxter, Eccleshill.
Rotherham .....	Mr. Frederick Edwards, Solicitor, and Mr. W. Unwin, Currier, Rotherham.	„ Eston Mines (Middlesbro') .....	Mr. W. Spencer, Eston Mines.
Ryde .....	Mr. Benj. Barrow, F.R.C.S., M.B.M.S., Ryde.	„ Farsley .....	Mr. D. Hainsworth, Farsley.
Salford.....	Mr. Wm. Noar, Borough Treasurer, Town Hall, Salford.	„ Hebden Bridge .....	Rev. W. Baldwin, M.A., Hebden-bridge.
Selby .....	Mr. William Allison, Bank Manager, Selby.	„ Hunslet(Leeds) .....	Mr. W. Cox, Hunslet.
		„ Idle, near Leeds .....	Mr. J. Hall, Idle.
		„ Keighley .....	Mr. C. D. Hardcastle, Keighley.
		„ Marske, near Redcar .....	Mr. J. Elstob, Marske.
		„ Middlesbro'-on-Tees .....	Mr. W. Taylor, Mechanics Inst., Middlesbro'-on-Tees.
		„ Scarborough ...	Messrs. Thos. Shields and J. Edmond, Mechanics' Institute, Scarborough.
		„ Slaidburn (Clitheroe) .....	Rev. D. Jones, Slaidburn.
		„ Stocksbridge (Sheffield) .....	Mr. H. Robertshaw, Stocks-bridge.
		„ Thirsk .....	Mr. J. G. Baker, Market-place, Thirsk.
		„ Wilsden (near Bradford).....	Mr. C. Petty, Wilsden.

The foregoing Programme of Examinations for 1865 is published in a separate form, and may be had gratis on application to the Secretary of the Society of Arts. A copy will be forwarded to each Institution and Local Board in a few days.

## Proceedings of Institutions.

**METROPOLITAN ASSOCIATION FOR PROMOTING THE EDUCATION OF ADULTS.**—On Friday, the 5th inst., a conference was held at the house of the Society of Arts, between members of the committee of the Metropolitan Association and of the Ladies' Sanitary Association, to take into consideration certain proposals for the promotion of female education, especially in the subjects of needlework and domestic economy. Mr. Harry Chester, the chairman of the committee, in opening the conference said that her Royal Highness the Princess of Wales had been pleased to offer an annual prize, through the association, open to females of the working classes, and the conference was to take into consideration the conditions upon which the prize should be awarded. As the progress of sanitary reform greatly depended upon an appreciation of its benefits by the working classes, it was proposed to establish courses of lectures, classes for instruction, and examinations, certificates, and prizes in connection with the institutions in union with the association, in order to familiarise their members with the laws of health, the construction of dwellings, food resources, and the economy of cooking, savings banks, and co-operative societies, and such other matters as were of practical benefit to the working classes, and a knowledge of which subjects might be applied by themselves to the improvement of their social condition. The particular scheme they had in view was that lectures should be delivered on simple questions of domestic economy in various districts where working men's wives, mechanics' institutions, or kindred associations were in existence; that local boards should be formed; that after the delivery of the lectures the working men's wives and daughters should be invited to form themselves into a class; and that there should be an annual examination of such classes, followed by the awarding of certificates and prizes for proficiency in domestic economy and needlework. The whole scheme was to be founded and carried out on voluntary principles, and it was proposed that her Royal Highness's prize of a bible, which would be of the value of £5, and be additionally prized from having her name written in it, should be given to the female candidate who, having the greatest number of marks in the examinations in elementary knowledge, should also obtain a certificate of proficiency in plain needlework. Various suggestions were then made as to the best course which could be pursued to carry the objects of the association into effect. It was unanimously agreed that the persons who would be most benefited and most easily induced to fall into the scheme would be young persons from 12 to 18, and that if habits of industrial competition could be promoted among that class, another generation would see the homes of the poor materially improved, waste avoided, and the resources of workmen made to go much further than they did at present. The most cordial approbation was expressed of the scheme, which will therefore be added to the forthcoming programme of the association.

**WORCESTERSHIRE UNION OF EDUCATIONAL INSTITUTES.**—A quarterly meeting of the committee of this Union was held on the 2nd July, when the annual report of the examiners for 1864 was submitted. From this it appears that this year there has been a falling off in the number of candidates and in the quality of the work done. The withdrawal of candidates from the Dudley and Stourbridge Institutes may partly account for this diminution in numbers. Candidates who have competed in the special and extra examinations are members of the following Institutes:—Bromsgrove Literary and Mechanics' Institute, Bromsgrove Church of England Girls' Night School, Dudley Mechanics' Institute, Hanley Castle Institute, Kidderminster Mechanics' Institute, Kidderminster Mutual Improvement Society, Kidderminster St. Mary's Night School, Redditch Night School, Stourbridge Mechanics' Institute, Stourbridge Church of England Young Men's

Association, Worcester Co-operative Reading-room, Ebley Mental Improvement Society. In the Special Examinations, senior branch, there were eight candidates, six of whom selected Gospel History, one English History, seven Geography of British Isles. In the junior branch there were 28 candidates, 24 of whom selected Gospel History, 14 English History, 16 English Geography. For the extra prizes the subjects were:—1. Whately's Easy Lessons in Money Matters, for which there were seven candidates. 2. Health for the Household: nine candidates. 3. Geography of Palestine: six candidates. 4. Domestic Economy (for female candidates): three candidates. 5. Mechanical Drawing: three candidates. 6. English Composition. 7. Essays on Physical Education: two candidates. 8. Euclid: one candidate. 9. Colenso's Arithmetic: several candidates. In the course of the ordinary business the resignation of the Union's indefatigable honorary secretary, the Rev. Wm. Walters, was announced with regret, the rev. gentleman being about to remove from Hanley Castle to Oldham, Lancashire.

## CITÉS OUVRIÈRES DE MULHOUSE.

The following is the substance of a report on this subject, addressed by M. Jean Dollfus to the International Philanthropic Congress, held in London in 1862:—

Mulhouse stands foremost among the industrial centres of France, and the praiseworthy efforts which the great manufacturers of that town have made to improve the condition of the working classes have been rewarded with the most satisfactory and gratifying results.

A society was formed in 1853, with a view to build small houses with gardens attached, to serve as dwellings for one family, and to be sold at cost price to working men only. Six hundred and eighteen houses have been successively built. These houses, very soundly constructed, are spacious enough to afford accommodation to families of six and eight persons. Their cost for the first years was between 2,000 and 3,000 francs. Now that more accommodation is required, and that the materials are at a higher price, they cost 2,600 francs for the smaller, and 3,600 francs for the larger ones. A term of sixteen years is allowed for the payment, and the purchaser must, before he takes possession of his dwelling, pay on account 300 francs. The remainder is to be paid by monthly instalments, of which the average does not exceed 25 francs.

Out of the 618 houses already built, 538 had been sold up to the end of August 1862. The sums received amounted to 650,000 francs, and more than fifty houses had been entirely paid up. The sale increases every year, and 255 houses have been purchased within the last three years.

When the society was started, many difficulties and prejudices had to be overcome. The working men had never thought of buying houses; they, for the greater part, lived in some sorts of filthy and unhealthy barracks, and the comforts of home-life were unknown to them. The example of those who have left their wretched abodes to live in the cheerful houses erected by the society, has made such an impression on the working population of Mulhouse, that every family now aspires to possess a little house of its own. The society hope to be able every year to build and sell from 80 to 100 of these houses, and this during a long period.

The workman who lives in the New Cités Ouvrières likes to remain at home. He tills his little garden during his leisure hours; and as he must be sparing to be able to pay for his dwelling, the public-house is no longer thought of. The population of the Cités Ouvrières is now about 5,000. The payments are made with the greatest punctuality, and the purchasers are often in advance. A fact worth mentioning is, that frequently young men who enlist in the army give to their parents the bounty which they receive from the government to be applied to the payment for the family house. More than twenty cases

of this nature have been recorded within the last two years.

The French Government, by a grant of 300,000 francs, has powerfully facilitated the development of the *Cités Ouvrières* of Mulhouse. This subvention has enabled the society to erect baths and washhouses and an infant school, a cooking *dépôt* and bakehouse, and other works of public utility—all devised for the greater comfort of the inhabitants of the *Cités Ouvrières*. As soon as new houses are constructed the society borrow on them for a term of 20 years.\* Nothing is refunded during the first five years, and the society reimburse the money borrowed with the product of the sales. The interest paid is generally 4½ per cent. Stores of articles of clothing, and of household utensils and furniture, have been established by the society. Thus the working men are enabled to save much, whilst many well-contrived or improved articles come into general use. Wood is the kind of fuel preferred by the working population of Mulhouse, and the use of that fuel occasions for every family an extra expense of at least 60 francs per annum. But it seems likely that wood will soon be superseded by coal, the society selling the latter at reduced price, and supplying cheap stoves appropriated to its use. It is believed that, when the prejudice is got rid of, a yearly saving of upwards of 150,000 francs will be realized.

The *Cités Ouvrières* of Mulhouse have already been imitated in many manufacturing towns of the department of the Haut-Rhin, as well as in a small town of the Grand Duchy of Baden, where more than 60 houses have been built. The sale is everywhere satisfactory, and more houses are in course of erection. A certain number of houses on the plan of those at Mulhouse were constructed at Basle, in 1862, and the promoters of this movement contemplate enlarging the scale of their operations. In various countries and in many French towns, benevolent persons do their best to enable the working man to invest his savings in the purchase of a house.

An association has been formed at Mulhouse among the manufacturers in order to provide pensions for old working men, and to erect an asylum for the invalids of work. Large sums have been subscribed towards the establishment of this useful institution, and there are some manufacturers whose yearly contributions amount to 15,000 francs, and even 20,000 francs. More than 250 workmen at present receive a pension of from 150 to 250 francs per annum, and 15 old men find a shelter in the asylum, where accommodation for 40 is provided. There is besides a house where travelling workmen are supplied with food and lodging for one night. More than 4,000 men in search of work avail themselves every year of this charitable institution.

The population of Mulhouse is about 50,000, and there are ten infant schools in the town. The children of the working people receive in these establishments their first education, and the habits of cleanliness and order which they contract there contribute in a great measure to their future welfare. When they leave the infant school they are sent to one of the parish schools, where their education is completed.

The baths and washhouses have proved a great boon to the working classes of Mulhouse. Owing to the fact that the hot water is generally supplied by the boilers of the neighbouring factories, the expenses are not considerable. A charge of five centimes for every two hours is made for the use of the washhouses and drying-rooms, and a very comfortable bath may be obtained at the price of twenty centimes, linen included. Although these charges are very low, the receipts exceed every year the expenses by 3,000 francs, which sum is applied to the extension and improvement of the establishment.

\*It must be borne in mind that the capital of the society is but 350,000 francs.

## Fine Arts.

**ART EXHIBITION AT MALINES.**—There is about to be held at Malines an exhibition of works of art of the Mediæval and Renaissance periods, contributed on loan from churches, convents, corporations, guilds, and private collections. The exhibition will be open from the 29th of August to the 25th of September. It is said that the collection will form the richest display of works of Flemish art ever brought together, many of them belonging to convents which can only be seen with difficulty at other times. Mr. Weale, of Bruges, has been entrusted with the carrying out the exhibition and the preparation of the catalogue, which is divided into ten sections, each arranged chronologically.

**FINE ART IN FRANCE.**—The demolition of the western end of the grand gallery of the Louvre has been commenced with vigour, and is to be rebuilt in harmony with the remaining portion, the work of Henry IV., which presents so great a contrast to the heavy, tasteless portions built by Louis XIV. and Napoleon I. The great mass of the pictures of the Flemish and later schools have in consequence been withdrawn for a time from exhibition, but some of the master-pieces of Rubens have been placed in the *salle d'état*, which connects the great gallery with the new ones now occupied by works of the French schools. Another gallery, to be called the Little Gallery of Napoleon III., and situated in the upper portion of the new Louvre, is now being prepared to receive the works of Lesueur, Joseph Verney, and other French painters.—The Delacroix exhibition, an interesting collection, which is being made by the *Société Nationale des Beaux Arts*, will be opened shortly in the gallery of the Boulevard des Italiens. The government has granted the loan of the works of Delacroix at the Luxembourg and Versailles, and the local authorities of Nantes, Tours, Nancy, Rouen, Lyon, and Arras, and several private individuals, have followed the good example; it is known, however, that difficulties have been raised in other quarters, and that the opening of the exhibition has been delayed thereby. This collection is looked forward to with much interest, as the peculiar style of Delacroix places his work at a great disadvantage in a general exhibition.—The Limoges exhibition has been highly successful, and the purchases amount to 40,000 francs. The Emperor sent two gold medals, which were given to MM. Richard and Amaury Duval. At Périgueux, on the other hand, the exhibition has been a comparative failure, and the poor class of works exhibited—or the low state of taste in that quarter—is shown in the fact that the average price of the pictures sold did not reach ten pounds.—A most remarkable fact at the present moment is the immense number of public statues erected or in progress; the illustrious subjects are not confined to any period or class. Nogent-sur-Marne raises one to Watteau; Sanites, to Bernard de Palissy, the potter; Vichy, to Madame de Sevigny, who first brought its springs into vogue; Nantes, to the late Minister Billault; Boulogne-sur-Mer, to Dr. Jenner; Paris, to the deceased painter Flandrin; Tarbes, to Baron Larrey, Napoleon I.'s army surgeon and favourite; Nîmes, to its local celebrity, the Poet Reboul; Saint Malo, to Chateaubriand; Colmar, to Admiral Bruat; and Orange, to Comte de Gasparin, formerly Minister, Prefect of Lyons, and a great friend to agriculture. This last statue is now to be seen at the entrance of the square of the Louvre, opposite to the Institut. The practice, common in Paris, of thus exhibiting the works of the sculptor in the metropolis before they are sent to the provinces, is one from which the artists of other countries might take a hint. It is gracious, and a legitimate means of publicity.—An able sculptor, Aristide Husson, died recently at Bellevue, near Paris. M. Husson was born in Paris, in 1803, and was a favourite pupil of David d'Angers. There is a fine group at the Luxembourg from his hand, "The Guardian Angel Raising a Repentant Sinner;" and

amongst his other works are the fine colossal figures of Summer and Autumn, in one of the great fountains of the Place de la Concorde; statues of St. Bernard, at the Madeline; of Saint Louis, of Marguerite de Provence, of Philippe le Hardi, and of Marshal Suchet, at Versailles; a fine figure of Haydée, in the Grenoble Museum; and many statues on the new Louvre and other public monuments. M. Husson was also a man of both literary and scientific attainments.

**THE COPYRIGHT ACT OF ENGRAVINGS.**—An action was recently brought in the Westminster County Court, by Mr. M'Lean, against a shopkeeper in High Holborn, named Hall, to recover compensation for an infringement of the Copyright Act of Engravings, by selling a print of the "Prisoner's Widow." The damages were laid at £10. The plaintiff stated that he had paid £700 for the engraving of the plate of that picture, and £150 to the artist for the copyright, making £850. The print had since been photographed, and the piratical traffic had been carried on to such an extent as to do incalculable injury to the publishers, who spent such large sums of money. The judge considered that the defendant had rendered himself liable under the Act, and accordingly made an order for the amount of damages claimed and costs amounting altogether to about £50.

**ANTWERP EXHIBITION.**—This was announced to open on the 7th of August; the number of works sent by French artists is about 150, and the list contains some good names, though very few belonging to the front rank.

**BRUSSELS EXHIBITION.**—The *Société du Cercle Artistique et Littéraire*, with a view to the encouragement of young artists, has placed at the disposition of the directors of the exhibition the sum of four hundred francs, to be divided into two prizes, one to be given to the best study in oil, of a head, the other to the best landscape, marine piece, or sketch of animals, both after nature. The best six of each kind to be exposed during the whole time of the exhibition

## Manufactures.

**STEAM BOILER EXPLOSIONS.**—The Engineer's report for June, made to the Manchester Association, says that during the month 272 engines have been examined, and 419 boilers, 22 of the latter being examined specially, and one of them tested with hydraulic pressure. Of the boiler examinations, 364 have been external, 8 internal, and 47 thorough. In the boilers examined, 154 defects have been discovered, two of them being dangerous. In two cases of fracture, described as dangerous, the fractures occurred at the seams of rivets at the bottom of externally-fired boilers. The double thickness of plate at the overlap of these boilers appears to be unable to stand the duty assigned to it, and cracks, in consequence, start from the rivet holes. These cracks are not confined to the outer overlap, but frequently run from rivet hole to rivet hole in the inner one, and thus so weaken the plate that the boiler rends in two. Another case of fracture took place at the crown of a furnace tube of an internally-fired boiler, in consequence of strengthening hoops having been added without intermediate ferules. Though such cracks in the furnace crown of an internally-fired boiler may entail the expense of repair, there is no danger, as with those at the bottom of an externally-fired boiler, of their leading to explosion. Four cases of external corrosion, described as dangerous, all occurred in internally-fired boilers, and were only discovered on going up the external brickwork flues, which shows the importance of "thorough examinations." One of these boilers was set upon a mid-feather, and found to be corroded throughout a considerable portion of its seating; while the plates of another differently set proved to be eaten away to the thickness of one-thirty-second of an inch where concealed by the front cross wall. Three of the cases of internal grooving are worth remark. Grooving is very constantly met with encircling the furnace mouth angle-irons at the

front end plates of internally-fired boilers, but in two of the instances in question it attacked three or four of the transverse seams of rivets at the crown of the furnace tubes, completely undermining the overlap of the plate; while, in the third instance, the grooving occurred at the ring seams at the bottom of the shell, and at the immediate vicinity of the feed inlet, showing the contraction of the metal produced by the too local entrance of the water, and the consequent importance of dispersing it by means of a perforated pipe. One explosion, resulting in the death of one person, occurred at an ironworks to a plain cylindrical egg-ended boiler, fired externally, and not under the inspection of the Association. The boiler was one of a series of five connected together, and working side by side, being No. 4 from the left hand. Its length was 40 feet, its diameter 6 feet, and the thickness of the plates three-eighths of an inch, while the pressure of the steam was 35lb., which was quite moderate for a boiler of such dimensions. It had rent into eleven fragments, which were scattered in every direction. The character of these rents was peculiar. The majority of boilers of this class divide into two parts at one of the transverse seams of rivets, but this one had not only rent transversely, but also longitudinally, from one end to the other, so as to divide the boiler in the main into four nearly equal parts, while these were again subdivided, and the shell ultimately broken up into eleven pieces. These rents were by no means confined to the lines of rivets, but had run through the solid plates entirely regardless of them, in many cases continuing for several feet within a few inches of the overlaps, and though so near, yet without running into them, but continuing in a straight line parallel to them. Indeed, there was scarcely a line of rivets disturbed, and some of the smaller fragments were torn out of the heart of the larger plates without a single rivet upon them. The boiler had been originally plated longitudinally, but on the seams over the fire giving way some time since, it had been repaired with three widths of plate laid transversely. These plates, which were 3 feet wide each, extended to a short distance behind the fire bridge, and it was at the ring seam of rivets that connected the new plating laid transversely, with the old laid longitudinally, that the primary rent occurred, and which it will be seen was situated, as is so usual in these cases, near to the bridge and at the bottom of the boiler; while the anomalous manner in which the boiler had rent was due to the combination of the transverse and longitudinal modes of plating. The manager of the works stated that their externally-fired boilers were a source of constant annoyance and expense, through getting out of repair, and it was no uncommon thing for one of the ring seams, a little behind the fire bridge, suddenly to rend through the line of rivet holes, merely in consequence of the slight change of temperature induced on the stokers' cleaning out the fires with the door open. The fact of these externally-fired boilers being ever found to give way in this treacherous manner, seems a sufficient reason to condemn them, especially at ironworks where the value of the charge of metal in the blast furnaces, which far exceeds that of the boilers, is jeopardised by them. Another explosion took place at a colliery. In this instance three persons were killed, and three others injured; while the boiler, which was not under the inspection of this Association, was the outer one of a series of three, and, as in the case of the previous explosion, was of plain cylindrical egg-ended construction, and externally-fired. The boiler, which was plated longitudinally throughout, was 32ft. long, 6ft. 6in. in diameter, and made of plates three-eighths of an inch in thickness, the pressure of steam being 35lbs. per square inch. The primary rent occurred at a longitudinal seam of rivets over the fire, which, after running in a straight line for some feet, developed transversely, dividing the shell into three fragments, all of which were thrown to a considerable distance from their original seating; while in addition, the adjoining boiler was dislodged, and turned up on end by the force of the

explosion. When it is stated that the plates at the fractured part proved to be very defective, and also that this boiler had leaked for some time at the seam over the fire, so that the introduction of bran had been resorted to in order to stop it, it will not be necessary, after what has already been said on the danger of these external-fired boilers, to add anything further to account for this explosion; while it will appear that these boilers, whether plated longitudinally, as in the present instance, or transversely as according to the more usual practice, are alike prone to explosion. A third explosion, by which one man was killed, was due to the collapse of the combustion chamber of a boiler of the double furnace or breeches class, working at a flour mill, and which was not under the inspection of the Association. The boiler was the left hand one of a series of three, the shell being 7 feet in diameter and 26 feet 6 inches long; while the diameter of the furnaces was 2 feet 9 inches, and that of the flue 3 feet 3 inches; the length of the combustion chamber being 4 feet 6 inches, the thickness of the plates three-eighths of an inch, and the steam pressure 45lb. The collapse of the combustion chamber had taken place, not at the crown but at the underside, and this arose from the fact, that while the crown was stiffened with roofing stays, assisted by tie rods connected to the shell of the boiler, the bottom of the combustion chamber was comparatively unstayed, having but a single angle iron running longitudinally on the centre line, in addition to a small gusset on each side. These breeches or combustion chambers have already proved a very fruitful source of explosion, and it is important that those who employ boilers of this construction should have these chambers stayed with vertical water tubes, which act as internal columns or struts, and thus prevent the top and bottom plates of the chamber coming together; while, in addition, it is frequently, if not always desirable, that the flue should be encircled with an angle iron hoop just at the waist or termination of the breeches piece. In some cases, where the pressure is low, this hoop of itself would be sufficient, and under many circumstances would perhaps be more easily obtained than the water tubes. An explosion occurred to the boiler of a locomotive engine while attached to a passenger train just after it had stopped at a railway station. The engine was of the ordinary type for passenger traffic, and built in the year 1849. It was not under the inspection of the Association. The boiler rent in the barrel or cylinder portion of the shell, which was composed of three belts or widths of plates. The belt adjoining the fire-box was completely severed from the remainder of the boiler, having rent close to one of the overlaps at a longitudinal seam below water line, and also through the line of rivet holes of the entire ring seam on each side of it. This belt was flattened out and thrown to the right, while the seam dome, in consequence of the previous rupture, was torn away, and blown to a considerable distance; added to which, the crank axle was broken, the wheel on the right-hand side disturbed, and the tubes bowed outwards, the remainder of the boiler receiving but little damage. On examining the edges of the fractured plate it was clear that the primary rent had occurred at the edge of the overlap of the longitudinal seam of rivets, for there a deep furrow was found which had eaten away the strength of the plate. These longitudinal furrows are the most frequent source of locomotive boiler explosions, and there appears to be no other way of detecting the silent progress of these furrows in time to renew the weakened plates so as to prevent rupture, than that of making more frequent "Internal Examinations."

**NEW METHOD OF HANGING DOORS.**—Mr. George Fawcett, of North Shields, with a view to obviate the accidents that are liable to happen in the opening or closing of doors fitted as at present, proposes to form a groove (a segment of a quarter circle) on the back of the door, making it to revolve round the shaft of a pillar tube, or circular moulding, fitted to the door frame

The ordinary butt or other hinges at the back of the door, are to be replaced by pivot points, plates and screws, bands or crooks, at the top and bottom of the door, the combination acting like a rule joint, and so presenting no opening at the back, in whatever position the door is placed. The doors may also be hung in the centre of the side frame, and so present the same appearance of door and frame on both sides. The door frames may be made of wedge-shaped sections, to economise timber, as these may be cut obliquely from square pieces. More space will thus be gained in the doorway for anything of length passing through obliquely. There may be graceful curves, that is, rounds and hollows, instead of the mouldings with sharp corners, that so much increase the labours of the joiner, painter, &c. It is expected that doors thus fitted will be less liable to be affected by warping, and will move more easily. The ordinary bolts of spring locks may be made broader and rounded off with a bulge, through which a small level surface in the middle may be slotted out for holding, thus exposing no sharp corner or edge for contact in passing.

**LOCOMOTIVE WITH EIGHT DRIVING WHEELS.**—On the floor of the library of the Society may be seen a model of a locomotive engine with eight driving wheels, for sharp curves and steep gradients. The model is to a scale of one-eighth the full size. The frame is rigid, and is provided with eight driving wheels of differing diameters, so that the machine will *roll* freely round double reversed curves of one chain and a half radius. By this arrangement the total weight of the engine is rendered available for the purpose of adhesion, while the load is distributed over so many wheels as not to damage the rails. At the same time, by the application of a brake, to be operated by steam power, the whole of the eight wheels are retarded and set free rapidly by the driver putting steam on or off. The same machine is capable of being extended to twelve drivers if required. With the increase of steam power in the locomotive, the increase of adhesive wheels has become a very important consideration. This is recognised on the Great Northern Railway, where Mr. Sturrock applies steam cylinders to his tenders to obtain the adhesion of an increased number of wheels, and thus, it is said, is enabled to draw one half more load. By the system now shown the increased power of adhesion is rendered compatible with the sharpest curves. This is a class of engine structure long aimed at by our friends on the continent, who have to work in hilly regions.

**THE NEW FACTORY ACT.**—The objects of this act are to provide for the effectual cleaning and ventilation of factories, and to regulate the labour of children, young persons, and women employed therein. The factories to which it applies are those used for the manufacture of earthenware (except bricks and tiles), of lucifer matches, of percussion caps, of cartridges, paper staining, and fustian cutting. An occupier of a factory not kept in conformity with this act is to be liable to a penalty not exceeding £10 nor less than £3. With the view of furthering the act a master can make rules to ensure cleanliness and ventilation, which rules are to be approved of by the Secretary of State, and if a person employed in the factory should infringe them he is to be liable to a penalty of £1. The act provides that meals are not to be taken in factories used for the purpose mentioned, and also regulates the age of children to be employed, who are not to be under eleven years of age.

**LIFE-PRESERVING APPLIANCES.**—There was a large concourse of people on the Seine and its quays the other day, when an exhibition was made in public of the efficacy of belts, waistcoats, mattresses, and other articles filled with cork in saving life in case of shipwreck. The articles in question were manufactured by a Parisian company, on the system of Dr. Ricard, who superintended the proceedings in person. The mattresses and various productions of this company differ from others composed internally of cork, in the fact that they are divided into



separate portions, so that, like a ship built with water-tight compartments, a local injury does not materially interfere with the general value of the article. The mattresses, for instance, are composed of ten or twelve transverse divisions, the ticking or other material serving for the case being continuous on the one side and indented on the other, to the whole thickness of the cork-stuffing, so that the mattress is composed of so many parallelograms hinged together on one side, and can be folded up with great ease and convenience for stowing away or for transport. The stuffing consists of cork in powder or in shavings, the former being used where greater softness is required, and the latter in ordinary cases, and these are prepared by means of special machinery arranged for using up waste cork of all kinds, a very important consideration in an economical point of view. The exhibition which took place the other day had for its principal object the exhibition of the value of cork mattresses as life preservers; a number of these were thrown upon the water, and a mattress, six feet by three, supported a man sitting, lying, or kneeling with perfect ease; even the narrow mattresses used on board ship, not more than fifteen inches wide, possess buoyancy enough to sustain a man of moderate weight, and, when fitted with straps and buttons, form a most valuable life-belt. The ordinary sized mattress for one person, containing about twenty pounds of cork, will sustain two men in the water without difficulty. After various experiments had been made with the cork mattresses, belts, and waistcoats singly, a dozen of the first-named articles were strapped together to form a raft, which carried a number of men from the Pont Royal to the Pont de la Concorde, amid the cheers of the assembled crowds. Similar exhibitions have taken place at Biarritz, Dieppe, Cherbourg, and elsewhere, and it is understood that the Company enjoys the patronage of the Imperial Marine.

### Commerce.

**INTERNATIONAL MONEY ORDERS.**—The French and Italian Governments have taken the initiative in a matter of great importance to those who have relations with foreign countries. The commercial world has provided for itself the means of transmitting money from one country to another, and for all but very small sums the system is complete. When, however, the amount to be remitted is below what is considered as a commercial quantity, the trouble of making a payment is out of all proportion to the business to which it relates. To meet this want the government of France and Italy have concluded a convention for the establishment of money orders between the two countries. The amount is limited to 200 francs (£8); the fees are fixed at the rate of 20 centimes per 10 francs (about 2d. for 8s.), or for any fraction of that sum which are to be paid by the sender, and no other fee or tax of any kind to be charged on any pretence whatever. Moreover, these money orders are to be transferable by endorsement. The date when this convention is to be put into practice is not yet announced. It is difficult to perceive any reason why this new arrangement should not work as easily as any other function of the Post-office, and it may be regarded as the first step in an important and popular commercial reform. In connection with the system of money orders in general, it may be observed that while the tax is at present greater in Paris than in London, the orders issued by the French post-office have the great advantage of being payable at any one of the money-order offices in the town, according to the convenience of the recipient.

**MINING STATISTICS.**—From the returns of Mr. Robert Hunt, F.R.S., the Keeper of the Mining Records at the Royal School of Mines, it appears that the value of the minerals produced in 1863, was £29,151,976, from which metals of the value of £36,364,327 were extracted. Of gold quartz there were produced 385 tons, worth £1,500;

of tin ore 15,157 tons, worth £963,985; of copper ore, 212,947 tons, worth £1,100,554; of lead ore, 91,283 tons, worth £1,193,530; of silver ore 88 tons, worth £5,703; and of zinc ore, 12,941 tons, worth £29,968. During the same year there were sold 95,376 tons of pyrites, for £62,035; and the rarer minerals—wolfram, uranium, gossans, arsenic, and earthy minerals raised, were of the value of £1,980,866. These items, with the value of 9,101,552 tons of iron ore, £3,240,890, and 86,292,215 tons of coal, £20,572,945, raise the total to £29,151,976, which was manufactured into nearly £40,000,000 worth of merchantable produce. To produce these results direct employment has been given to at least 500,000 men, so that the mineral industries of the kingdom may be considered as alone supporting a population of nearly 3,000,000.

**COAL IN THE SOUTHERN STATES.**—An American paper says that there are extensive coal mines lying on both sides of the James river, a few miles above Richmond, being about twenty miles from north to south, with an average breadth of five miles. The coal is bituminous, and it has been largely used for steam purposes and for the production of gas. These mines were probably the earliest worked of any in the United States, mention being made of them in the *American Journal of Science* of 1818, as having been in operation for thirty years previously. The works, as now carried on, are at a great depth, the deepest shaft sunk being about 800 feet. Anthracite coal mines have been opened within a few years in Montgomery, Pulaski, and Wythe counties, and also along the range of mountains in the western part of Augusta county. In Brush Mountain, along the north-western line of Montgomery county, and in Price's Mountain, six or seven miles south-east of this, some very good coal is mined. The amount of coal mined in Virginia during the year 1860 was 382,000 tons, valued at about 700,000 dols. at the mines. There are extensive beds of bituminous and semi-bituminous coal in North Carolina, in Chatham and Moore counties in Deep River. There are also extensive beds of semi-bituminous coal in Rockingham and Stokes counties, on the Dan River. The only mines of importance in Southern Tennessee are on the Sewanee River.

**AUCTION SALE OF SHARES IN INDIA.**—The Indian journals give an account of an auction sale of Back Bay Reclamation Company's shares at Bombay. The profit realised on the 400 shares sold amounted to upwards of a million sterling. The average profit was Rs. 26,345 per share. The company therefore will start with a reserve fund of 50 per cent. on its proposed capital. The sale produced most extraordinary excitement. A Parsee acted as auctioneer, and most of the bidders were natives. The first share was knocked down for 24,500 rupees, but the price speedily rose to 30,000 rupees, and then to Rs. 35,000, at which price a goodly number were sold. The fact of 400 shares of a company which has not, nor is likely to commence operations for some time to come, fetching such an enormous premium, is probably without a precedent.

### Colonies.

**THE FINANCIAL POSITION OF NEW ZEALAND** appears to be such as at present not to require any additional taxation by an increase of customs duties. A colonial paper maintains that if at a later period this be the case, and the treasurer's accounts should show a deficiency, the Province of Auckland, "which is the only one that reaps material benefit from the war," ought to be called upon to make good, at least to a considerable extent, the deficit produced by the war expenses. "Thousands of military settlers are to be brought to Auckland at the cost of the colony. Millions of acres of fine land, obtained from the natives by way of confiscation, will secure to

Auckland the means of offering inducement to immigrants to come, and for capitalists to invest their capital in that colony. It is only just that, as Auckland is the only gainer by the war, it also should contribute a larger share towards the expenditure which the war has already entailed upon us."

**BUILDING IN MELBOURNE** has been proceeding with great rapidity. New and very handsome houses, shop-warehouses, and stores are taking the place of old and incommensurable structures. In every street evidences of industry in this direction are presented. The building trades never were more fully or profitably occupied.

**THE CANADIAN TRADE.**—The official statement of the arrivals and tonnage of ocean vessels at the port of Quebec, up to the date of the departure of the royal mail steamship *Hibernian*, shows a falling off of 247 in the number of vessels, and decrease of 115,653 tons in the aggregate tonnage—the aggregate number being in 1864 535 ships of 290,626 tons, against 780 vessels and 406,279 tons. The same returns show that up to the 7th of July in the present year 12 steamers (ocean) arrived at Quebec, of an aggregate of 16,902 tons, against the same number of steamers of 17,417 tons—an increase in the tonnage of 505 tons. The coasting trade of Quebec has also shown a decrease, the numbers being in 1864, 33 vessels of 2,636 tons, against in 1863, 40 vessels of 3,625 tons, a falling off of 7 vessels and 980 tons.

**FINANCES OF NATAL.**—Twenty years ago, when Natal first became British territory, its revenue at the end of the first year amounted to £830. Five years later it was £9,268, in five years more £28,648, at the end of another five years £42,800 and in 1863 it reached £123,089—an excess of more than £6,000 over that year's expenditure. The growth of the revenue is stated to be in great part due to the population drinking and smoking more. It is calculated that the European population paid in 1863 taxes to the amount of £5 per head. Yet the expenditure for education, roads and bridges and public works, immigration, and mail carriage—barely exceeded £30,000.

### Obituary.

**EDWIN WARD TRENT** was born at Penn Mill, Yeovil, Somersetshire, October 24th, 1810. His grandfather was governor of Ilchester prison for more than thirty years. When quite a boy he had a taste for making canals, drains, &c. When about arriving at manhood, he formed an ardent desire for a seafaring life, but his mother being averse to it it was abandoned, though with long-continued regret. He then adopted the trade of rope, line, and twine making, in which he excelled, and which furnished him with a wide and congenial field for experiment and invention. He produced a machine for coiling ships' cables, which it was till then asserted could never be done. He introduced several improvements in the machinery for spinning yarn for rope-making, and machines made on his system are now extensively used. Some of these machines were shown at the late International Exhibition. At the Great Exhibition of 1851 he gained a medal for the preparation of New Zealand flax (*Phormium tenax*) and fishing-lines made of it; and, at Sir W. Hooker's request, the specimens were deposited in the Museum at Kew-gardens. He was the original inventor of machinery for extracting the long fibre from the husk of the cocoa-nut, upon which he spent much time and money. While manager of the Park Hemp Works, at Old Ford and East Greenwich, he made great improvements in spinning machinery, besides inventing a machine for finishing twine, which increased the economy of working and diminished the waste. The activity of Mr. Trent's mind was shown in various other ways. He was the promoter of several companies for encouraging the growth of hemp and flax, and assisted in the formation of the Intercolonial Steam Navigation Company.

He also exercised great influence in the direction of emigration. He was fond of travelling, and in Canada and the United States alone he journeyed over 6,000 miles; having travelled also in many other countries. Some years ago he published a "Tract" on the subject of training boys who had not been convicted of crime, on a self-supporting system, for colonial life. He had been a member of the Society of Arts for about thirteen years, occasionally contributing a paper for insertion in this *Journal*. He died at his residence, at Homerton, March 22, 1864, in the 54th year of his age.

### Publications Issued.

**DICTIONNAIRE DE CHIMIE INDUSTRIELLE**, by Messieurs Barreswill and Aîné Girard, in five volumes octavo. (*Ferdinand Tandon et Cie., Rue des Ecoles, Paris.*) This work, as the authors say in the preface, is not, strictly speaking, a dictionary, but partakes of the mixed character of a dictionary and a treatise. The object of the work is to give detailed descriptions of the industries which are based upon the phenomena of chemistry. These industries are classed in alphabetical order, and are explained at length, including the putting up of factories and the necessary machines, utensils, and plant, as well as the materials used, produced, and derived from them, and the method of working them. Messrs. Barreswill and Girard have associated with themselves in the undertaking men specially known in their several branches of knowledge, so as to render their work as far as possible an exact representation of the chemical industry of the period. The dictionary is comprised in four volumes, the fifth volume being an introduction, in which is given the elements of those sciences of which industrial chemists should have knowledge. Among the contributors to the book, intermingled with the names of Barreswill and Girard, will be found that of Gannal, attached to an article on the preservation of organic substances; of Bouilhet, the distinguished son-in-law of Christoffe (electro-chemical deposits); Maumené (oils, &c.); Reveil (milk, butter, cheese, &c.); Kop (metals in ordinary use); Ste. Claire-Deville and Paul Morin (aluminium); Vée (pharmacy); Davanne (photography); Salvétat (pottery); Balard (products of saline springs); Peligot (glass and enamel); Barral (wines and spirits), and many others, including Berthelot, Colin, Perrault, Schlösing, Riche, Lesieur, Lucas, Sobrero, and Girardin. Mons. Girard furnishes the articles on acids, alkalis, minerals, nearly all the chemistry of metals, waters, lighting by means of fatty bodies, essences, ethers, &c.; Barreswill the articles on paper, phosphorus, colours, gelatine, glue, &c. The work generally is intended specially for the use of manufacturers and managers of works who desire to make themselves thoroughly acquainted with the science and practice of the business in which they are engaged.

**METRIC TABLES**, in which the British standard measures and weights are compared with those of the Metric System, by C. H. Dowling, C.E. (*Lockwood and Co.*). This work, which was announced in a former number, is now published, and is thus arranged:—First there is a short history of our own standards of weight and measure, ending with a table of legal denominations; then a similar sketch of the origin of the standard of the Metric System, with a table of the system appended as in the preceding case; next follows the comparison between the two systems, forming the "Data for the Tables," in which the equivalents between the two systems are given reciprocally for every denomination of weight and measure, from the lowest to the highest. In this portion of the work the equivalents are taken sometimes to the full extent of decimals, but always to a large number, to ensure accuracy in the results for the tables. Authority is given at every step for the correct origin of the fundamental numbers by quotations from official docu-

ments in which they may be readily found. The detailed and "ready reckoning" tables follow, forming the bulk of the work, and are perfect as far as the exchange between the two systems of the "statute" denominations in each; sixty-four tables are required for this purpose, some of them extending, under the same head, for seven pages, in order to reach the higher amounts likely to be sought. Miscellaneous tables are added, such as pounds on the square inch converted to kilogrammes on the square centimetre, &c. An elaborate thermometric table of Fahrenheit's, the Centigrade and Reaumur's thermometers, with a table of comparison between the English and Metric barometers, close this onerous undertaking. This is the first work of its kind published, and it appears to be in every respect equal to any of the works which have been published by the governments of nations on adopting the metric system permissively.

### Notes.

ANCIENT ROMAN CALENDAR.—One of the latest acquisitions to the Neapolitan Museum is a Roman calendar disinterred at Pompeii, in the neighbourhood of the Gate of Isis. It consists of a square block of white marble, having on each of its four sides the information relating to three months of the year. First come the signs of the Zodiac, followed by the number of days in each month, and the indication of the nones. The hours of day and of night are carefully marked. At the periods of the winter solstice are read the words *hiemis initium*. All the above-mentioned particulars are drawn up in perpendicular columns. There are besides instructions respecting the principal agricultural operations to be undertaken in each month, with the names of the divinities to be worshipped, and the religious festivals and rites to be observed. On the upper surface of the block is the engraved figure of Apollo driving the car of the sun, and on the lower surface, Ceres gathering ears of corn in a field.

LEAD-POISONING OF COWS.—Mr. V. Tuson, Professor of Chemistry in the Royal Veterinary College, in a letter to the *Star* says:—"In May last three cows, the property of Mr. Mullins, of Rugby, died, after exhibiting symptoms which could not be referred by Mr. Watson, the veterinary surgeon consulted, to any disease with which he was acquainted. On making a *post-mortem* examination of the cows fragments of lead were found in their alimentary canals, especially in the reticuli or paunches. It was then remembered that the whole of the cows affected, although they had from November, 1863, up to the period of their death in May last, been pastured at a distance from the butts of the Rugby Rifle Volunteer Corps, had, prior to November, 1863, been kept in a field adjoining these butts. This field was carefully examined by Mr. Watson, and among the herbage he discovered fragments of lead which corresponded in every way with those found in the stomachs of the cows. Now the lead here referred to is that which had been scattered from the targets consequent upon the impact of bullets, and is called 'bullet spray.' Some of this spray had been evidently picked up by the cows while feeding, it remained in their stomachs several months, where, during that time, it slowly, but continuously, underwent solution and subsequent absorption into the system, and so, doubtless, poisoned the animals in question. Since the death of the three cows, the owner has lost two more, under precisely the same circumstances as those already related. The viscera of one of the cows which died last were sent to me for analysis, and I was enabled to demonstrate the presence of lead, not only in the coats of the stomach and intestines, and in their contents, but likewise in the liver and kidney, thus proving the passage of that poisonous metal into the circulation. I also had an opportunity of examining the bullet spray, which enabled me to ascertain that most of it was encrusted with a pale drab-coloured

substance, composed chiefly of carbonate of lead, a highly-poisonous plumbic compound. It was this carbonate of lead which, I believe, more immediately caused the death of the cows."

SUBAQUEOUS NAVIGATION.—The Messrs. Russell are now engaged in the manufacture of an extensive and very novel order for the Russian Government, who seem to have resolved upon making that country a great maritime power. A fleet of war vessels to sail under the surface are now being constructed for Russia. To afford some idea of the magnitude of the Russian enterprise, it may be stated that the cost of the tubes alone for a single vessel of this submarine fleet, will be nearly £9,000. It will contain no less than thirty-eight lengths of wrought-iron tubes of sixty feet each, having a 13-inch bore, and a thickness of seven-eighths of an inch. The specifications demand that they shall be capable of bearing a pressure of 2,000lb. to the square inch, and Messrs. Russell test every tube up to 2,500lb. The submarine boat which these tubes are destined for, is of such dimensions that it is estimated that 200 tons of iron and steel will be used in its construction. The cost will, it is calculated, reach 175,000 silver roubles, or £27,000, and the expenditure of this amount has been authorised by the Emperor. Each vessel is to have engines worked by compressed air, and to have a very strong break with provision for attaching large cylinders, charged with powder, to the bottom of vessels, to be fired by electricity. The parties navigating the vessel will see what they are doing by means of "bulls' eyes," and they will be able to regulate the depth at which they swim, generally keeping quite close to the surface.

### Correspondence.

WATER SUPPLY OF NAPLES.—SIR,—I read in your *Journal* of the 8th of July, a report of Mr. John F. Bateman, civil engineer, upon the project of Signor Felice Abate, of Naples, for supplying that city with water. Having occupied myself with this subject, it is one with which I am well acquainted, and I wish to point out, for the information of your readers, in the cause of exactitude, that the data upon which Mr. Bateman has drawn his conclusions cannot be accepted as correct by those accurately acquainted with the subject. First—The length of the Roman aqueduct of Claudius is 53 English miles from Naples, not 47, as might be inferred from the report, the exact length being 80 kilometres. Secondly—The aqueduct of Claudius was constructed now more than eighteen centuries since, and was first destroyed Anno Domini 70, the epoch of the first eruption of Vesuvius, which destroyed Pompeii and Herculaneum. Nothing but the two tunnels, formed through hills of rock, now remain intact, if, indeed, these tunnels can be fairly admitted to be so. One of these tunnels is only two kilometres, and the other six kilometres long, out of the whole length of eighty kilometres. The state of the preservation of the remaining portion is more than problematical; indeed, the route of the aqueduct must be mainly traced by its ruins. How, indeed, could such a work be expected to resist the effect of weather, and the vibration the earth is subject to in these parts, for more than eighteen centuries? Leturi, even in the sixteenth century, estimated the simple repairs of the aqueduct at two million dollars, or 9,500,000 frs., which, taking the then greatly increased value of money into consideration, would now give a very much larger sum. Thirdly. With respect to the quantity of water yielded by the springs of Serino. During last year, about November, 1863, a commission, specially nominated by the Council of Naples for the purpose of studying the question of the water supply in general of Naples, measured the quantity of water yielded by the springs of Serino, which were then found to yield only 4,845,700 gallons per day. It is true, that in 1861, Mr. Abate measured the springs

of Serino, and reported them to yield 8,733,552 gallons per day. Still, for the supply of Naples the lowest yield must be taken into consideration. The daily quantity of water required by Naples, estimated by Mr. Bateman at from 12 to 15 million gallons per day, over and above the 4,845,700 gallons, must be therefore provided for. This leaves, according to Mr. Bateman's lowest estimate, a daily quantity of 7 million gallons still to be provided for, or, according to the highest estimate, 10 million gallons. As to the possibility of augmenting the supply, as proposed by Mr. Bateman, by collecting the surface water draining from the surrounding mountains, into monster store reservoirs, even could this be done in a country like Naples, where the temperature is high, the water, necessarily mixed with impurities derived from mountain torrents, would lose its freshness, and serious inconveniences hygienically would result. The principal element of success in an enterprise of this nature at Naples, would be the preserving the freshness and the wholesomeness of the water. Fourthly—As to the revenue proposed to be derived from the use of the fall of the water of the aqueduct as a motive power, I am utterly at a loss to conceive how such a revenue is to be obtained, knowing, as I do, the industrial resources of this country. There is an abundance of hydraulic power in the neighbourhood of Naples, with infinitely preferable conditions or advantages, as it is situated near the sea. Besides, the salubrity of the water must necessarily be more or less injured if works and factories are to be established along the course of the aqueduct intended for the alimentation of a great town.—I am, &c., COUNT DE LA TOUR DE BRUIL, Civil Engineer. Turin, 27th July, 1864.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

- Par.  
Numb. *Delivered on 14th July, 1864.*
- 11. (1). Weights and Measures (Metropolis)—Further Return.
  - 410. Civil Bill Processes, &c. (Ireland)—Returns.
  - 456. Transportation from the Channel Islands—Memorial.
  - 476. Postage (Australia and New Zealand)—Return.
  - 477. Postage (Australia)—Letter.
  - 200. Bill—Portsmouth Dockyard (Acquisition of Lands) (amended).  
Gold Coast (Military Operations)—Plan.  
New Zealand—Further Papers.

### SESSION 1863.

- 493 (vii). Import and Export Duties—Return.

### *Delivered on July 15, 1864.*

- 369. Government Property—Return.
- 466. Schools of Art—Report.
- 468. Education (Inspectors' Reports)—Report.
- 469. Chamber of London—Annual Accounts.
- 472. Superior Courts of Law—Return.
- 486. Public Works (Manufacturing Districts) Act (1863)—Report.
- 202. Bills—Armagh Archbishop's Revenues.
- 203. „ Justices Proceedings Confirmation (Sussex).
- 204. „ Public Works (Manufacturing Districts).
- 207. „ Drainage and Improvement of Lands (Ireland) (Supplemental).

## Patents.

### *From Commissioners of Patents Journal, August 5th.*

#### GRANTS OF PROVISIONAL PROTECTION.

- Agricultural implements—1764—F. W. Turner.
- Artificial fuel—1842—D. Barker.
- Bottles, &c., machinery for washing—1782—T. Johnson.
- Breweries, &c., apparatus employed in—1841—F. Gregory.
- Bricks and tiles, machinery for making—1865—J. Slater.
- Buckles, hooks, &c.—1872—R. Couchman.
- Cannon, &c., construction of—1832—R. A. Brooman.
- Carts, &c.—1610—W. Stevens.
- Cements—1780—I. Swindells.
- Climatic apparatus—1849—J. Jeffreys.
- Cocks, taps, and valves—1877—A. Prince.
- Cotton, cleaning from seeds—941—H. Higgins.
- Cotton, cleaning from seeds—1825—J. Higgins.
- Cylinders, manufacture of—1852—E. Peyton.

- Dredging or excavating machines—1863—G. Furness and J. Slater.
- Drinking vessels, arrangement applicable to—1859—F. L. Lyne.
- Eggs, preservation of—1642—T. Nichols.
- Electro-telegraphic apparatus—1823—A. V. Newton.
- Fabrics, treatment of printed or dyed—1814—A. Barton, J. Sidebotham, and T. H. Nevill.
- Felted cloth, manufacture of—1835—J. Barcroft.
- Fibrous materials, twisting and doubling—1824—A. Topp and J. Holt.
- Filter—1799—A. Espirat and E. Sauce.
- Fire-arms, breech-loading—1774—G. Davies.
- Fire-arms, breech-loading—1816—J. R. Cooper.
- Fire-arms, breech-loading—1844—T. Wilson.
- Fluids, &c., raising and propelling—1758—J. Bernays.
- Freezing mixtures, apparatus for agitating—1821—J. Whitford.
- Gas lamps, lighting, &c.—1792—T. C. Eddy and M. Burdon.
- Human diseases, applying chemical fumigations to the treatment of—1784—A. A. Bonnet.
- Iron and steel, furnaces for heating and smelting—1786—J. Clayton.
- Luggage, &c., checking the weight of—1810—W. E. Gedge.
- Machinery, facilitating reciprocating movements of—1776—J. Gill.
- Machines, packing for—1708—G. Hartshorne.
- Marking ink, manufacture of—1828—J. Moller.
- Metals, composition for preventing the oxydation of—1804—H. E. F. De Briou.
- Motion, apparatus for transmitting—1802—T. Bourne.
- Motive power—1010—B. W. A. Sleigh.
- Motive power—1850—J. P. Ravard.
- Mowing and reaping machines—1794—W. McI. Cranston.
- Mowing and reaping machines—1851—W. E. Newton.
- Mules, self-acting—1862—L. R. Bodmer.
- Musical instruments—1773—M. Henry.
- Oils, means of decongelating—1827—W. E. Gedge.
- Ordnance, &c., breech loading—1760—J. Needham.
- Ores, drying and calcining—1815—E. Young.
- Paper, &c., printing and perforating—1874—V. Wanostrocht.
- Paper-hangings, manufacture of—1756—R. Smith and J. Booth.
- Paper, manufacture of—1870—J. and W. Olive and E. Partington.
- Pianoforte and harmonium, combined—1800—E. Lea.
- Pig iron, manufacture of—1789—A. Barclay.
- Pumps, construction of—1860—J. H. Beattie.
- Railway carriages, construction of—1754—J. S. Tucker.
- Railway carriages, obtaining communication from one to another—1837—W. S. Lawson.
- Railway signals—1858—J. Lang.
- Railway tracks, working of moving parts of—1873—W. Anderson.
- Railways, permanent way of—1617—W. E. Gedge.
- Rivet-making machines—1820—F. Peskett.
- Safety valves—1847—J. H. Johnson.
- Sails, reefing, &c.—1806—O. Phalp.
- Sails, reefing fore and aft—1817—J. Hart.
- Salt, manufacture of—1833—D. Hall and A. L. Roosen.
- Sewing machinery—1822—N. Salamon.
- Ships, &c., armour for—1778—J. Chalmers.
- Ships, &c., constructing and propelling—1836—A. F. Osler.
- Ships, construction of—1866—M. Scott.
- Ships, raising sunken or stranded—1871—J. A. P. MacBride.
- Ships, screw propellers for—1818—R. Lees.
- Silicium, fluoride of—1766—R. A. Brooman.
- Slate, marble, &c., apparatus for cutting—1838—J. Clark.
- Smoke-burning furnaces—1798—F. C. Cosserrat.
- Smoky chimneys, apparatus for curing—1704—S. Freeman.
- Spindles, attaching knobs to—1826—J. and J. L. Hinks.
- Steam boilers, feed apparatus for—1857—H. A. Bonneville.

### *From Commissioners of Patents Journal, August 9th.*

#### PATENTS SEALED.

- |   |                           |
|---|---------------------------|
| 326. T. Snowdon.                                  | 378. W. Riddle.           |
| 334. V. de Stains and T. Rogers.                  | 379. J. Redford.          |
| 336. J. Smith.                                    | 382. W. Whiteley.         |
| 338. W. C. Stobart.                               | 389. G. Bohn.             |
| 346. F. Spence.                                   | 395. W. C. Fuller.        |
| 357. J. M. Faget.                                 | 425. R. S. Symington.     |
| 361. A. and E. M. Denny.                          | 480. C. Hull.             |
| 368. T. White.                                    | 487. F. Weil.             |
| 369. J. Henderson, S. C. Child, and W. L. Duncan. | 615. W. R. Bowditch.      |
| 370. W. Winstanley & J. Kelly.                    | 975. G. T. Bousfield.     |
| 371. W. E. Gedge.                                 | 1214. G. T. Bousfield.    |
| 372. W. Drake.                                    | 1287. J. L. and J. Hinks. |
| 375. F. W. Burton.                                | 1290. G. T. Bousfield.    |
|   | 1429. A. V. Newton.       |

#### PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

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|-----------------------------------|--|
| 1914. E. J. Muygridge.            | 1947. M. A. F. Mennons.                    |
| 1922. W. E. Newton.               | 1948. W. and J. Galloway and J. W. Wilson. |
| 1931. J. Henderson & J. Broadley. | 1969. N. D. P. Maillard.                   |
| 1936. J. Lewis.                   | 1976. A. V. Newton.                        |
| 1956. W. Clark.                   | 1977. A. V. Newton.                        |
| 1994. H. Wilde.                   | 1987. A. V. Newton.                        |
| 1975. G. H. Bovill.               |  |
| 2109. W. D. Player.               |  |

#### PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

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|----------------------|---------------|
| 2182. P. Carmichael. | 2183. R. Hoe. |
|----------------------|---------------|